FIG. 1

REGIONAL FACTORS

terrain including mountains, hills and trees

signal reflections off buildings or other structures

EMF interface

microwave interference

radio frequency interference

mixing (channel overlap or frequency separation) of an interfering signal with
the desired signal resulting in intermodulation and added noise

200

DYNAMIC FACTORS

weather

storms

humidity

seasonal variations

220

RETRANSMISSION FACTORS

from transmitter to transmitter to set-top box

from transmitter to satellite to terrestrial set-top box

from transmitter to satellite to transmitter to set-top box

240

FIG. 2

Error Correction Engine

controls and optimizes bandwidth and Quality of Service (QOS) of a given broadcast based on regional factors including terrain, dynamic factors including weather and season, and retransmission factors

compiles data on reported factors and predict unreported factors that cause data transmission errors

employs error correction on data to be transmitted, based on at least one of the data on the reported factors and the unreported factors

utilizes error correction coding and error detection coding

utilizes Forward Error Correction (FEC) and carouselling

dynamically adjusts error correction levels

utilizes convolutional (tree) codes and block codes

no other error analysis input is required for error correction

FIG. 3

$$D(t) = D_r(t) + D_p(t)$$

$$D_r(t) = D_r(t)_{s=regional\ data} + D_r(t)_{s=environmental\ data}$$

$$= D_r(t)_{s=terrain} + D_r(t)_{s=weather} + D_r(t)_{s=atmospheric\ data} + D_r(t)_{s=sunspot\ activity} + D_r(t)_{s=keplerian\ data} + D_r(t)_{s=retransmission\ factors}$$

$$D_p(t) = D_p(t)_{s=regional\ data} + D_p(t)_{s=environmental\ data}$$

$$= D_p(t)_{s=terrain} + D_p(t)_{s=weather} + D_p(t)_{s=atmospheric\ data} + D_p(t)_{s=sunspot\ activity} + D_p(t)_{s=keplerian\ data} + D_p(t)_{s=retransmission\ factors}$$

Key:
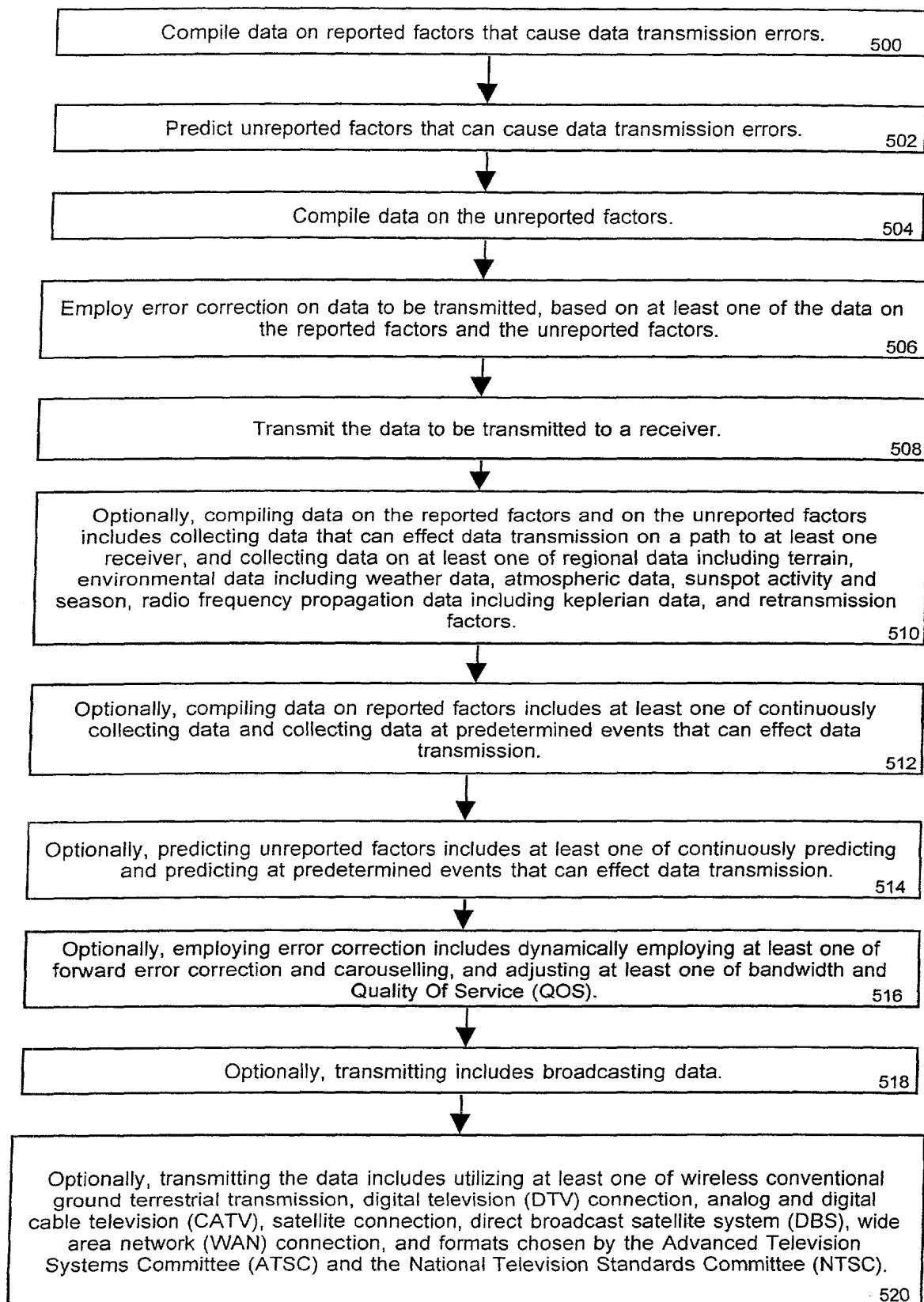D= data
t = time
r= reported
p=predictive
s= source

FIG. 4

Compile data on reported factors that cause data transmission errors. 500

Predict unreported factors that can cause data transmission errors. 502

Compile data on the unreported factors. 504

Employ error correction on data to be transmitted, based on at least one of the data on the reported factors and the unreported factors. 506

Transmit the data to be transmitted to a receiver. 508

Optionally, compiling data on the reported factors and on the unreported factors includes collecting data that can effect data transmission on a path to at least one receiver, and collecting data on at least one of regional data including terrain, environmental data including weather data, atmospheric data, sunspot activity and season, radio frequency propagation data including keplerian data, and retransmission factors. 510

Optionally, compiling data on reported factors includes at least one of continuously collecting data and collecting data at predetermined events that can effect data transmission. 512

Optionally, predicting unreported factors includes at least one of continuously predicting and predicting at predetermined events that can effect data transmission. 514

Optionally, employing error correction includes dynamically employing at least one of forward error correction and carouselling, and adjusting at least one of bandwidth and Quality Of Service (QOS). 516

Optionally, transmitting includes broadcasting data. 518

Optionally, transmitting the data includes utilizing at least one of wireless conventional ground terrestrial transmission, digital television (DTV) connection, analog and digital cable television (CATV), satellite connection, direct broadcast satellite system (DBS), wide area network (WAN) connection, and formats chosen by the Advanced Television Systems Committee (ATSC) and the National Television Standards Committee (NTSC). 520

FIG. 5